Measuring the market for technology

Public Comment to the Measuring Innovation in the 21st Century Advisory Committee, Economics and Statistics Administration, U.S. Department of Commerce

by

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Abstract
This comment addresses the first and second themes identified in the call for comment. It proposes the collection of data on payments and receipts for disembodied (intangible) technology, including but not limited to technology licensing. It also supports the proposal made in the public comment by Prof. Dale Jorgenson, for the prototype new architecture for national accounts.

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Introduction

This proposal addresses the issue of measuring the flow of innovation from one part of the economy to another. In particular, it seeks to redress the anomaly that our official statistics measure well how much steel or cement a firm purchases but not how much technology it purchases, if this technology is not embodied in a new machine.

Although technical innovation has been a significant driver of economic growth over the last two centuries, the last two decades of the 20th century are distinguished by how technology itself has become a traded commodity. Currently, intellectual assets comprise the large part of the value of many of our largest and most successful firms, and innovation occurs as a part of a network of established firms and small startups, with universities increasingly participating in these networks. New markets and exchanges for technology and intellectual property are being developed, to rationalize and strengthen the technology licensing arrangements that typically connect organizations in these networks.

Payments and receipts for technology licensing have grown rapidly, both inside the United States and internationally. Recent estimates by Carol Robbins of the Bureau of Economic Analysis, using a variety of data sources available to the Department of Commerce, indicate that they amounted to $66 billion in 2002, and payments for the licensing of all intangible assets exceeded $100 billion in the same year.

Knowledge gaps to be filled

There are two major gaps that need to be filled. First, who is creating innovation and how is that new knowledge flowing through to the final user? In other words, in order to understand the sources and impact of innovation, we need to measure the use, not only of embodied technology such as computers, but also disembodied technology, through licensing. Only then can one have

accurate measures of Total Factor Productivity, or TFP, which is the measure economists suggest for measuring innovation.

The second, and related, gap to be filled has to do with the valuation of intellectual property assets. Such assets now comprise a substantial part of our economic assets. Intellectual property assets are difficult to price since they are rarely traded on markets. However, they are effectively "rented" when technology is licensed. We can go a long way in valuing intangible technical assets if we can capture these licensing data. These data will help refine the pricing models of intellectual property. In turn, this can have a variety of benefits, including the enhancement of the efficiency of the market of technology itself.

Proposal:
a) Firm level data on receipts and payments: It is proposed that systematic measures, at the level of the individual organization, be collected on how much the organization pays for the use of others' intellectual assets, in the form of technology licensing payments. This will be measured separately for payments for use of copyrighted materials and for trademarks and franchise fees. Simultaneously, organizations will be asked to report their receipts from such sources. Such data collection will not entail significant costs. Such data already collected for transactions involving establishments outside the United States. A pilot study may be needed to ascertain whether existing IRS data can be used to measure payments and receipts for disembodied technology.

Alternatively, one may explore modifying the existing surveys of manufacturing and service establishments to collect data on purchases of disembodied technology. The existing R&D survey done by the National Science Foundation on behalf of the Census Bureau, may be modified to collect data on the licensing activities of R&D performing organizations. Pilot studies may be needed to assess the viability of doing so. Other potential sources of data are from the Licensing Executives Society (LES), which can be a useful source, particularly for international comparisons.

b) Transaction level data
A second, and more ambitious, proposal is to contract with academic, non-profit and private sector organizations to compile periodic data on transactions involving technology licensing. These data would be held confidentially as well. These data would be crucial in developing better pricing models for intellectual property. Such data collection will be more costly. It will require identifying a representative sample of buyers and sellers, identifying the appropriate respondents, and implementing the survey. It may be appropriate to carry out a pilot study to assess the nature and extent of the data available.

Rationale

(i) Measuring this "market for technology" is vital for measuring innovation in a knowledge economy. Insofar as innovation results in the creation of intangible knowledge assets, which yield a flow of benefits over time, measuring transactions in intangible knowledge assets is a good way to measure the value of these assets.

(ii) Further, this will complement the proposed New Architecture for the National Accounts, by providing more accurate measures of purchases of the services of

intangible inputs. Given that such purchases have grown very substantially in the last two decades, ignoring them risks the very objective that the New Architecture is to accomplish.

(iii) This complements the current efforts to improve measures of the services sectors, which account for the vast bulk of the U.S. economy. Many services firms play a crucial role in generating and diffusing innovations through the economy.

A New Architecture of National Accounts.

A key impact of innovation for an economy consist of how much output increases after controlling for the various inputs. This is approximately captured by Total Factor Productivity. Key barriers include the development of accurate price indices for the services of different types of capital goods. The rational and details of this proposal are noted in the public comment of April 18 by Prof. Dale Jorgenson. Accordingly, I shall not repeat them, other than to support emphasize the importance of accurate and timely measures of total factor productivity, both at the aggregate level, as well at a more disaggregated level.